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STS-85 Crosses Midpoint

Five Microgravity Science Experiments Underway

A suite of five microgravity science experiments, managed by the Microgravity Research Program Office here at Marshall Center, are currently flying aboard the Space Shuttle Discovery now in the last half of an eleven-day mission that began last Thursday.

The Protein Crystallization Apparatus for Microgravity built by Marshall Center is one of several techniques developed to grow large numbers of protein crystals in space for later evaluation on Earth.

Protein crystals are used in basic biological research, pharmacology and drug development. Molecular structures derived from protein crystals allow the design of drugs customized for the protein that interacts with a particular disease.

The crystallization apparatus uses vapor diffusion to grow crystals, relying on water vapor pressure differences within a chamber to create optimum growth conditions. The crew activated the apparatus the first day of the mission.

On STS-85, a total of 630 specimens were transported to orbit using 10 cylinders — four in a cabin-temperature locker, and six within a Single-locker Thermal Enclosure System — a refrigerator incubator module that keeps temperatures in the range needed to enable successful experiments.

"Among the many samples growing aboard the Space Shuttle on this mission are proteins aimed at drug therapy design efforts involving prostate cancer, AIDs and allergic reactions," explained experiment Principal Investigator Dr. Daniel Carter of New Century Pharmaceuticals in Huntsville. "We're looking forward to the end of the mission when we'll have the opportunity to analyze the space-grown protein crystals."

Ronald Porter of the Microgravity Research Program Office manages the Biotechnology Research Program.

STS-85 microgravity science payloads also include the Bioreactor Demonstration System experiment aimed at verifying the operation of a "space bioreactor" and a cell tissue incubator that enables researchers to perform cell biotechnology studies in space. The tests aboard STS-85 will investigate the make up of cardiac and smooth muscle cells in microgravity, as well as continue studies started on STS-70. The experiment hardware was developed by the Johnson Space Center and the principal investigator is Dr. John. M. Jessup of Harvard Medical School in Cambridge, Mass. Better understanding of cell tissue growth may aid in repair of damaged tissues and provide technology for the growth of three-dimensional cultures in space or on Earth. These three-dimensional cultures react to drugs much more like those in a living organism than those produced in standard laboratory

continued on page 5

Huntsville Mayor Spencer to Speak During Women's Equality Program

Huntsville Mayor Loretta Spencer will be the keynote speaker during the Marshall Center's Women's Equality Day Program on Aug. 26 at 9 a.m. in Morris Auditorium.

This August marks the 77th anniversary of the ratification of the 19th amendment to the Constitution guaranteeing American women the right to vote.

According to Ann Westendorf, Marshall's Federal Women's Program Manager, beginning in the mid-19th century, several generations of women suffrage supporters lectured, wrote, marched, lobbied and practiced civil disobedience to achieve what many Americans considered a radical change to the Constitution.

Employee Update Set for Aug. 20

An Employee Information Update will be held on Aug. 20 at 10 a.m. in Building 4200, Morris Auditorium. Employees who are unable to attend may view the Update on Centerwide closed circuit television.

STS-94 Commander James Halsell addresses employees in Morris Auditorium during a visit to Marshall last week where the STS-94 crew presented a program on the recently completed Marshall-managed Microgravity Science Laboratory mission.

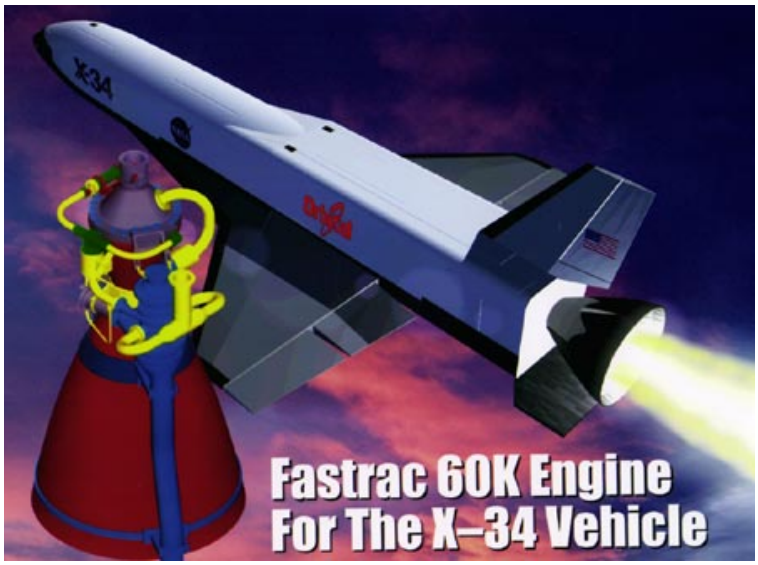
Fastrac Engine Passes Critical Tests for X-34 Vehicle

by Deana Nunley

A critical series of tests on a rocket engine that could power the next generation of space launch vehicles has been successfully completed at the Marshall Center. The Fastrac engine — only the second American-made engine developed in the last 25 years — is the primary propulsion system for the X-34 technology demonstration vehicle.

Recently completed tests evaluated the engine's thrust chamber assembly at high pressure almost identical to flight conditions. The primary combustion of propellants — a mixture of liquid oxygen and kerosene — occurs in the thrust chamber assembly. As the engine heats, the chamber is cooled by charging or scorching a liner inside the chamber that decomposes to prevent excessive heat buildup.

"The thrust chamber assembly performed as designed, which is another indication that the Fastrac is an engineering breakthrough," said George Young, Fastrac engine chief engineer. "Marshall engineers developed this engine in a much shorter-than-usual design cycle at significantly lower costs than a typical rocket engine."

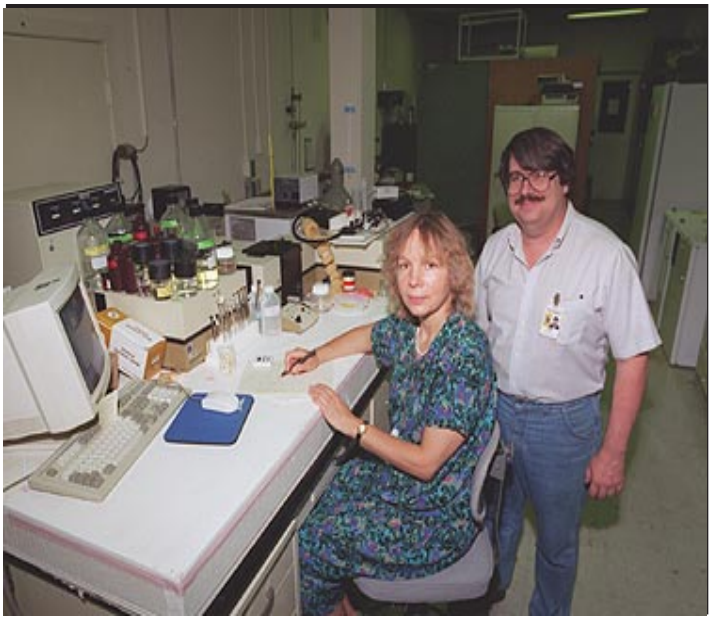


"These tests demonstrate that this simple, low-cost engine component performs in flight-like conditions," said Danny Davis, manager of Low Cost Technologies project, which oversees the Fastrac engine. "These successful test firings mark a major milestone in the progression to low-cost space propulsion."

Each Fastrac engine will initially cost approximately $1 million — about one-seventh of the cost of similar engines. The fastrac provides 60,000 pounds of thrust to boost payloads weighing up to 500 pounds.

Individual components, such as the thrust chamber assembly, gas generator and fuel tanks, are undergoing testing at Marshall. The first-stage booster, with the tanks and engine assembled, will be tested at Stennis Space Center in Mississippi beginning in early 1998.

The Fastrac engine is one element of NASA's Advanced Space Transportation Program, managed at Marshall Center. The program is an initiative to reduce the cost of space launch and develop technologies for space transportation needs for the next 25 years.



Dr. Elezabeta Karpova of Russia, who is on a one year tenure working as a research associate in Marshall's Space Sciences Laboratory, is shown with her advisor Dr. Marc Pusey of ES76. Karpova is working on her proposed research titled "Studying protein aggregation in, under, and over saturated solutions by x-ray and neutron scattering." ***Photo by Terry Leibold***

Picnic Slated for Last Marshall Management Meeting of 1997

The Marshall Management Association's last meeting for 1997 will be a picnic on Aug. 28 at the Marshall Picnic area's west side pavillion. A social is scheduled for 5 p.m. with a barbeque dinner following at 5:30. The program will include the presentation of the four MMA scholarships to the awardees.

Cost for the picnic is $15 payable on that day. Those individuals who are interested should respond by e-mail to John Cather by Aug. 26.

Inter-Agency Exercise Challenge Logs To be Turned in by Aug. 31

Exercise logs for the Intra-Agency Exercise Challenge should be completed and turned in no later than Aug. 31 to CM21X.

The Marshall Center has won the exercise challenge three times as well as being named runner-up three times.

For more information contact Bill Stease (4-7571) or Pat Mirandy (4-7570).

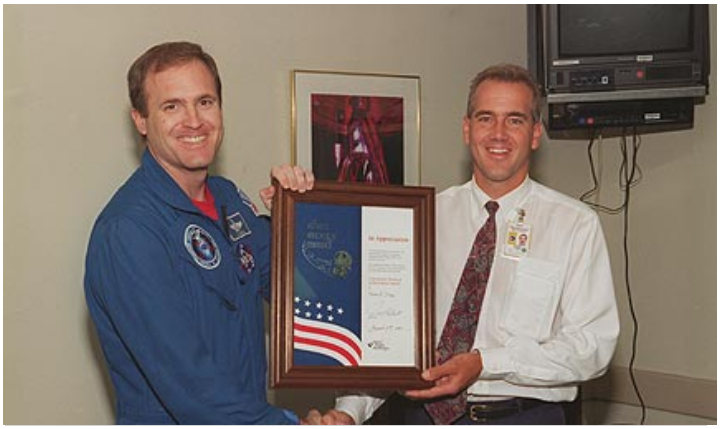
Marshall Center Employees Receive Silver Snoopy Awards

Members of the STS-94 Shuttle crew presented Silver Snoopy awards to Marshall Center employees last week. The awards were presented by Astronauts Donald Thomas, Michael Gernhardt, Roger Crouch, James Halsell, Susan Still, Janice Voss and Gregory Linteris.

Photos by Emmett Given, Terry Leibold, Dennis Olive, Danny Reeves, Gloria Barnes, Fred Deaton and Jack Ray.

Astronaut Michael Gernhardt presents Snoopy Award to June Malone, CA10.

Astronaut James Halsell presents Snoopy Award to Martha Manning, EM31.



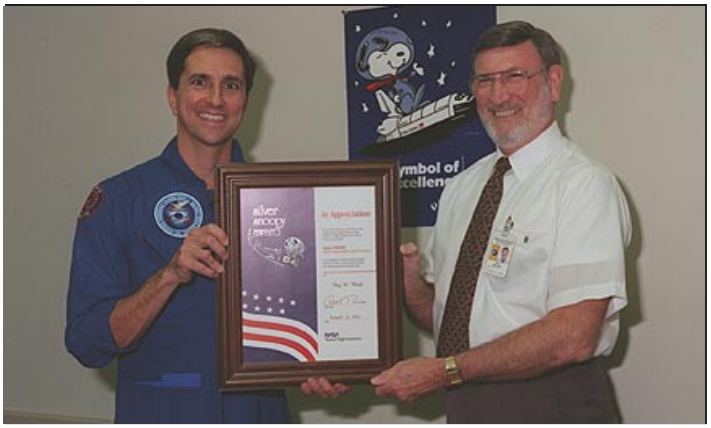
Halsell with award recipients Brian Pung, EE12.

Halsell with award recipient Paul Dumbacher, EL63.

Halsell presents Snoopy award to Ronald Schlagheck, MG01.

Astronaut Susan Still with Snoopy Award recipients from left Melody Bodiford, EO36, Tomas Nesman, ED32, Tony Fiorucci, ED23, Karla Kochevar, EO46, and Kenneth Welzyn, ED12.

Still presents Snoopy Awards to Michael Kynard, EP13 and Andrew Hornfeck, EP54.



Astronaut Donald Thomas with Snoopy recipient Ray Woods, GP40.

Astronaut Still with recipient Judy Milburn, CR20.

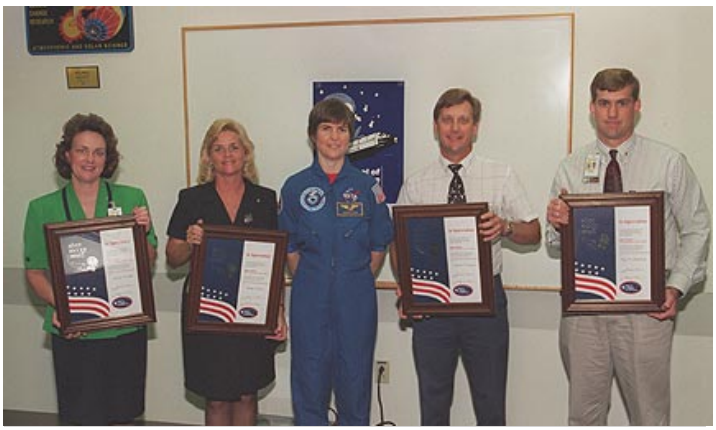
Snoopy recipient Cecelia Culver, AI01 with Halsell and Alternate Payload Specialist Paul Ronney (left).

Halsell with Snoopy recipient Tina Walker, BF60.

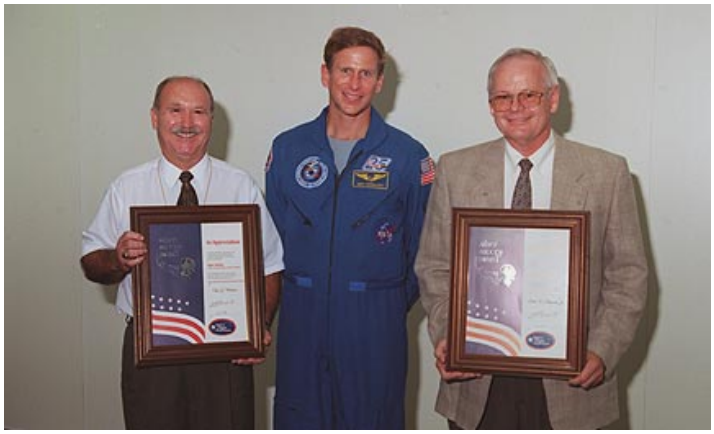
Gernhardt present Snoopy award to Howard Gibson, EH13.

Astronaut Thomas with recipient Lurie Pemberton, LA02.

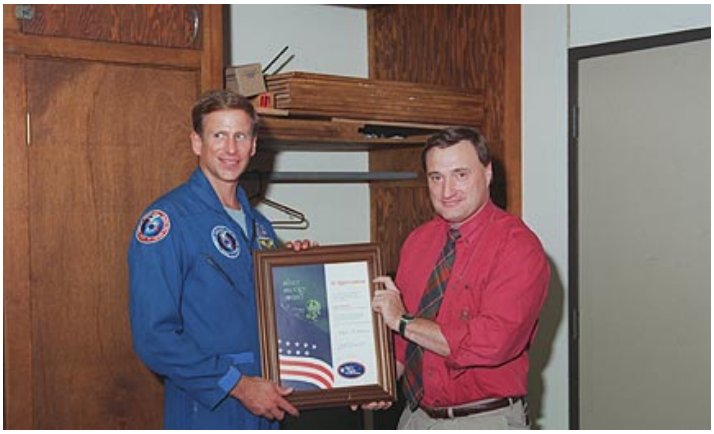
Astronaut Roger Crouch with Snoopy recipients Bobby Sloane, EB44 and Ricky Humphries, EB32.



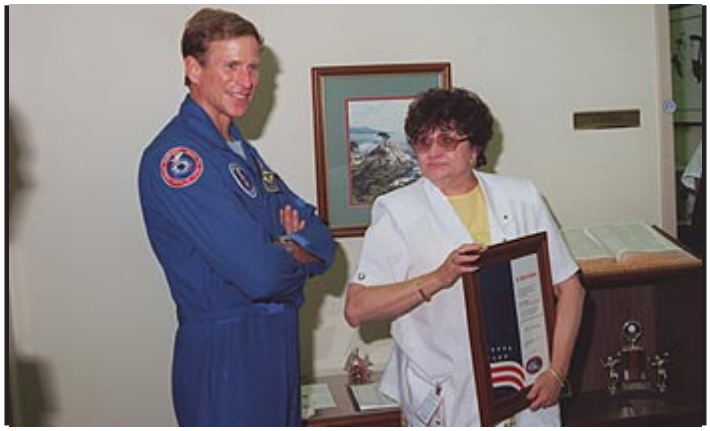
Astronaut Janice Voss presents Snoopy Awards to (from left) JA64 recipients Annette Sledd, Brenda Graves, and EF81 recipients Michael Vanhooser and Doyce Mitchell



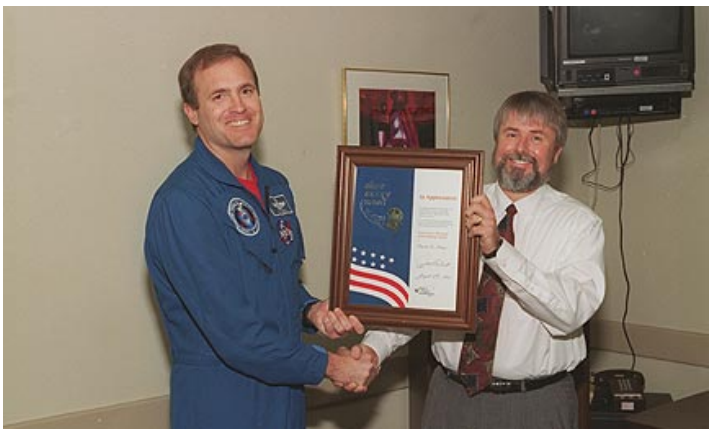
Gernhardt with recipients Olan Whitaker, PP04 and Clovis Malmede, PD21



Gernhardt with Snoopy recipient Mack Blackman, CM41.



Gernhardt with Snoopy recipient Pegi Dunnigan, CN41.



Astronaut Halsell congratulates Snoopy Award recipient Dennis Moore, EE54.

STS-85 Mission

from page 1

practices, and may provide advances in drug therapy testing on Earth.

Two experiments of the mission's microgravity science mix are provided by NASA's Lewis Research Center including an experiment to measure a critical property of the element xenon and another to study the behavior of burning solids in space.

The Critical Viscosity of Xenon experiment, led by Dr. Robert Berg of the National Institute of Standards and Technology in Gaithersburg, Md., seeks to explore the critical point, a unique state in which fluid is neither a liquid nor a gas, using the fluid xenon under conditions not possible on Earth. The improved understanding of the xenon critical point phenomena may provide better theoretical modeling of very basic fundamental physical processes with eventual potential impact on industry and manufacturing.

The Solid Surface Combustion Experiment is designed to characterize and compare the spread of flame in microgravity and in normal gravity and improve the understanding of the physical processes of the burning of solids. The experiment, led by Dr. Robert A. Altenkirch, Dean of the College of Engineering and Architecture of Washington State University in Pullman, Wa., may improve our understanding of combustion of solids on Earth and improve fire safety on Earth and in spacecraft.

Also, the Microgravity Isolation Mount (MIM) developed by the Canadian Space Agency, to isolate small, sub-rack size science experiments from on-orbit high-frequency vibrations, is making its first Space Shuttle flight. One version of the Microgravity Isolation Mount was launched to the Russian Space Station Mir in April 1996, as part of the Microgravity Research Program's payload for the NASA/Mir Science Program. That experiment on Mir was used to operate Marshall Center's Liquid Metal Diffusion experiment that flew on STS-81 and was returned on STS-84. The Shuttle version of the Microgravity Isolation Mount will test more advanced isolation techniques that those used on Mir. A NASA researcher at Lewis is co-investigator for the MIM.

Marshall is the lead center for NASA's Microgravity Research Program and manages the microgravity projects and science discipline programs of Lewis Research Center, the Johnson Space Center and the Jet Propulsion Laboratory.

"The research being conducted on STS-85 is a current example of the diversity and value of microgravity research for basic science, applications, technology and international cooperation" said Joel Kearns, Manager, Microgravity Research Program. "Results from STS-85 will add more unique information to our national storehouse of information of how our world works, the foundation of today's high technology economy. In addition, the protein crystal growth and Bioreactor Demonstration System research will contribute to the health and welfare of our citizens."

The STS-85 mission is scheduled to land Aug. 18 at the Kennedy Space Center.